IN THE CLAIMS:

The following is a complete listing of the claims which supersedes all previously submitted listing of the claims.

1. (original) A process of recording information in a nucleic acid polymer, comprising:

a) modulating the translocation of first and second nucleic acid strands through a channel between a dissociation medium and a hybridization medium, while modulating an electrostatic potential across the channel to modulate the incorporation of a metal ion in a nucleic acid duplex as the duplex forms in the hybridization medium;

b) wherein the channel separating the hybridization medium and the dissociation medium is dimensioned to allow lineal translocation of the nucleic acid duplex or a metal-containing nucleic acid duplex between the hybridization medium and the dissociation medium;

c) and wherein the first and the second nucleic acid strands comprise a plurality of nitrogen-containing aromatic bases covalently linked by a backbone, the nitrogen-containing aromatic bases of the first nucleic acid strand being capable of being joined by hydrogen bonding in the hybridization medium to the nitrogen-containing aromatic bases of the second nucleic acid strand so that the nitrogen-containing aromatic bases on the first and the second nucleic acid strands form hydrogen-bonded base pairs in stacked arrangement in the nucleic acid duplex, the hydrogen-bonded base pairs being capable of interchelating the metal cation coordinated to a nitrogen atom in one of the aromatic nitrogen-containing aromatic bases to form the metal-containing nucleic acid duplex.

2. (original) The process of claim 1, further comprising the step of reading information from the nucleic acid polymer by detecting the presence or absence of the metal cation in the nucleic acid duplex.

3. (original) The process of claim 2, wherein the presence or absence of the metal cation is detected by measuring the electrical conductance across the channel as the nucleic acid duplex is translocated through the channel between the hybridization medium and the dissociation medium.

4. (currently amended) The process of ~~any one of claims 1 through 3~~ claim 1, wherein the nucleic acid duplex is coupled to a magnetic bead, and the translocation of the nucleic acid duplex through the channel is mediated by modulating the magnetic field across the channel.

5. (currently amended) The process of ~~any one of claims 1 through 4~~ claim 1, wherein the channel is formed in a lipid membrane.

6. (currently amended) The process of ~~any one of claims 1 through 5~~ claim 1, wherein the channel is a pore forming protein.

7. (currently amended) The process of ~~any one of claims 1 through 6~~ claim 1, wherein the hybridization medium and the dissociation medium are electrically conductive aqueous solutions.

8. (currently amended) The process of ~~any one of claims 1 through 7~~ claim 1, wherein the first and the second nucleic acid strands are deoxyribonucleic acids and the nitrogen-containing aromatic bases are selected from the group consisting of adenine, thymine, guanine and cytosine.

9. (currently amended) The process of ~~any one of claims 1 through 8~~ claim 1, wherein the metal cation is selected from the group consisting of Zn^{2+}, Co^{2+}, and Ni^{2+}.

10. (currently amended) The process of ~~any one of claims 1 through 9~~ claim 1, wherein the metal cations are substituted for imine protons of the nitrogen-

containing aromatic bases, and the nitrogen-containing aromatic bases are selected from the group consisting of thymine and guanosine.

11. (currently amended) The process ~~any one of claims 1 through 10~~ claim 1, wherein at least one of the aromatic nitrogen-containing aromatic bases is thymine, having an N3 nitrogen atom, and the metal cation is coordinated by the N3 nitrogen atom.

12. (currently amended) The process of ~~any one of claims 1 through 11~~ claim 1, wherein at least one of the aromatic nitrogen-containing aromatic bases is guanine, having an N1 nitrogen atom, and the metal cation is coordinated by the N1 nitrogen atom.

13. (original) A process for detecting a base pair mismatch in a nucleic acid polymer, comprising:

a) detecting the presence or absence of divalent metal cations in base pairs of a nucleic acid duplex by measuring electrical conductance across a channel as a metal-containing nucleic acid duplex is translocated through the channel;

b) wherein the channel separates a first pool and a second pool of a medium, the channel being dimensioned to allow sequential monomer-by-monomer lineal translocation of the metal-containing nucleic acid duplex between the first and second pools of the medium;

c). wherein the nucleic acid duplex comprises a first strand of nucleic acid and a second strand of nucleic acid, the first and the second nucleic acid strands comprising a plurality of nitrogen-containing aromatic bases covalently linked by a backbone, at least some of the nitrogen-containing aromatic bases of the first nucleic acid strand matching the nitrogen-containing aromatic bases of the second nucleic acid strand and the matching base pairs being joined by hydrogen bonding to the nitrogen-containing aromatic bases of the second nucleic acid strand, the

matching nitrogen-containing aromatic bases on the first and the second nucleic acid strands forming hydrogen-bonded base pairs in stacked arrangement along the length of the nucleic acid duplex;

d) wherein the matching hydrogen-bonded base pairs of the metal-containing nucleic acid duplex comprise an interchelated divalent metal cation coordinated to a nitrogen atom in one of the aromatic nitrogen-containing aromatic bases, and wherein a mismatched base pair does not interchelate a divalent metal cation.

14. (original) A device for storing information comprising a metal-containing nucleic acid duplex housed in the lumin of a channel formed in a membrane.